BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

As rescanning documents *will not* correct images, please do not report the images to the Image Problem Mailbox.

EP 000035939 A1
SEP 1981

COME- ★ P61 J9944 D/39 ★EP --35-939

Grinding or honing machine using template - grinds several workpieces simultaneously using common template and follower disc

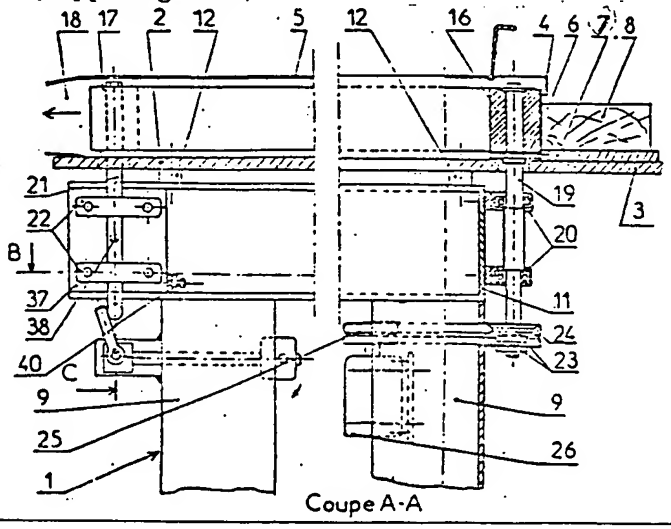
SOC COMECA SA 06.03.80-FR-005112

(16.09.81) B24b-17/02

04.03.81 as 400336 (1099MJ) (F) FR2229501 BE-419717 GB-939438 FR1387314 GB-984926 FR2185283 US1905190 BE-817192 E(BE DE IT)

The grinding or honing machine has a work table (3) which forms part of a platform (2). The workpiece (8) is clamped above the template (7) to the worktable (3). A grinding wheel (4) is mounted on a spindle (19) immediately above a freely rotating disc (6) of the same diameter as the wheel. As the grinding wheel is moved across the face of the workpiece it continues to remove material until the disc comes into contact with the template (7) so that the workpiece is ground or honed to the same contour as the template.

With this method of mounting the workpiece and template it is possible to make several passes over the workpiece without having to reset the machine. It is also possible to grind several workpieces mounted one above the other using a common template. (19pp Dwg.No.2)



Coupe A-A

(19) Europäisches Patentamt
Europ an Pat nt Office
Office eur péen d s brevets

(11) Numéro de publication: **0 035 939**
A1

(12) # DEMANDE DE BREVET EUROPEEN

(21) Numéro de dépôt: 81400336.4

(22) Date de dépôt: 04.03.81

(51) Int. Cl.³: B 24 B 17/02

(30) Priorité: 06.03.80 FR 8005112

(43) Date de publication de la demande:
16.09.81 Bulletin 81/37

(84) Etats contractants désignés:
BE DE IT

(71) Demandeur: Société CO.ME.CA. S.A.
Zone Industrielle de Melou
F-81100 Castres(FR)

(72) Inventeur: Marc, Claude
14 Rue du Docteur Puech
F-81210 Roquecourbe(FR)

(74) Mandataire: Ravina, Bernard
44, avenue Léon Blum
F-31500 Toulouse(FR)

(54) **Machine à outil rotatif pour les travaux de reproduction ou de finition.**

(57) Machine à outil rotatif, par exemple abrasif, pour les travaux de finition ou de reproduction et notamment pour l'usinage du contour de au moins une pièce (8) fixée à plat sur un gabarit (7) de reproduction, la dite machine étant constituée d'un bâti (1) sur lequel est montée une table de travail (2) pourvue d'au moins un plan de travail (3) horizontal dans la zone duquel est situé ou partiellement situé au moins un outil (4) fixé sur un arbre rotatif vertical (19) sensiblement au-dessus d'un guide cylindrique (6) monté fou sur le même axe au dessus du niveau du plan de travail (3) en sorte qu'il puisse coopérer avec le bord du gabarit.

Sur la dite machine le guide (6) comporte des moyens susceptibles de maintenir l'ensemble gabarit pièce à différentes distances de l'outil (4) en sorte de permettre sans déplacement du gabarit (7) par rapport à la pièce (8) plusieurs passes d'usinage du contour de la dite pièce à des profondeurs différentes.

EP 0 035 939 A1

./...

MACHINE A OUTIL ROTATIF POUR LES TRAVAUX DE REPRODUCTION OU DE FINITION.

La présente invention a pour objet une machine à outil rotatif destinée à reproduire sur une pièce les motifs d'un gabarit ou pièce mère ou à finir une pièce ébauchée à partir d'un gabarit ou pièce mère.

Il est connu dans le cas d'usinage par reproduction d'une pièce préalablement ébauchée ou non de faire appel à des machines dotées d'un organe de fixation de la pièce à usiner et du gabarit sur un plan de travail et d'un outil rotatif tel une bande abrasive déplaçable suivant le contour du gabarit (brevet Français N° 2.229 501 PETITJEAN).

L'inconvénient de ce type de machine est que l'on doit avant tout usinage régler de manière très précise la position de la pièce par rapport au gabarit et/ou par rapport aux outils.

Un autre inconvénient réside dans la mobilité de l'outil qui dans le brevet Français N° 2.229 501 est portée en bout de bras articulé qui prend du jeu à l'usage d'où une perte de précision de l'usinage.

D'autres machines connues utilisent un chariot porte-outil mobile sur des glissières du plan de travail et qui est doté d'un galet coopérant en guidage avec le gabarit.
Pour obtenir un guidage précis de la pièce à usiner les guides ou glissières du chariot porte-outils doivent être réalisées de manière précise et les différents organes sont généralement pourvus d'aménagements spéciaux limitant leur usure ce qui rend la fabrication de telles machine longue et onéreuse.
D'une manière générale, ce type de machine est plus particulièrement destiné à l'usinage de grandes séries de pièces et son emploi de par son coût n'est pas envisageable pour des petites ou moyennes séries.

La présente invention telle qu'elle est caractérisée dans les revendications ci-après a pour but : la suppression de ces inconvénients en mettant en oeuvre une machine simple à réaliser

Dans la zone du plan de travail la machine est pourvue d'au moins un outil rotatif 4 abrasif, monté dans un carter de protection 5 et pourvu d'au moins un guide 6 (fig.12) coopérant avec un gabarit 7 sur lequel est fixée la pièce à usiner 8 préalablement ébauchée, le dit gabarit et la dite pièce étant manoeuvrée par l'utilisateur de la machine.
Le bâti 1 est constitué par quatre pieds 9 verticaux, de même longueur entretoisés à leur extrémité supérieure par deux longerons 10 horizontaux et parallèles et par au moins une traverse 11 horizontale et perpendiculaire aux dits longerons en bout desquels elle est fixée.
Les longerons 10 sont dotés de plusieurs orifices cylindriques d'axe vertical de passage de moyen de fixation de la table 2 au bâti 1.
De préférence, la machine est pourvue d'au moins trois cales 12 interposées entre les longerons et la table pour régler la position de celle-ci par rapport au bâti et/ou pour régler l'orthogonalité de son plan de travail par rapport à l'axe de l'outil rotatif.

La table 2 en métal ou autre se présente sous la forme d'une paroi plane de préférence horizontale de contour extérieur polygonal ou curviligne pourvue d'au moins un contour curviligne, circulaire ou polygonal définissant le plan de travail 3.
Le contour du plan de travail est tel que quelle que soit la position de l'utilisateur de la machine par rapport au dit contour, celui-ci puisse sans aucune gêne accéder à l'outil rotatif.
La forme du contour du plan de travail est telle qu'elle permet également de disposer intégralement le gabarit sur le plan de travail et ceci malgré la position du dit gabarit par rapport à l'outil rotatif lorsqu'il usine la pièce.

Selon une forme préférentielle de réalisation comme représentée en figure 1 la table se présente sous la forme d'un rectangle d'axe longitudinal parallèle aux longerons prolongé au delà d'un de ses petits côtés par le plan de travail 3.
Ce plan de travail épouse sensiblement la forme d'un triangle dont la grande base est perpendiculaire à l'axe longitudinal de la forme rectangulaire et déborde la dite forme de part et

partiellement située dans le plan de travail montée sur des galets 16 et 17 d'axes perpendiculaires au dit plan.
Les bandes abrasives sont avantageusement logées dans un carter de protection raccordé à une buse 18 d'aspiration des déchets d'usinage.
Ce carter est pourvu d'au moins deux couvercles montés sur charnières pour permettre le changement de la bande abrasive et/ou des galets 16 et 17.
Ces galets sont calés de manière amovible par tous moyens connus sur des arbres rotatifs verticaux et s'engagent chacun dans un orifice ménagé dans la table 2 et tourillonnent dans des paliers situés sous la dite table.

L'arbre 19 correspondant au galet 16 est monté dans au moins deux paliers 20 fixés par tous moyens connus à une des faces verticales de la traverse 11 du chassis 1.
L'arbre 21 correspondant au galet 17 est monté dans au moins deux paliers 22 fixés sur un moyen de mise en tension de la bande et de réglage du parallèlisme des deux galets 16 et 17.
L'arbre 19 au-delà de son palier inférieur 20 est doté d'une poulie 23 pourvue d'au moins une gorge recevant une courroie de transmission 24 coopérant avec une poulie 25 calée sur l'arbre de sortie d'un organe moteur 26 solidaire du chassis 1.
La courroie 24 est mise en tension par un tendeur 27 connu en soit, représenté schématiquement en fig. 1.
Ce tendeur est fixé par tous moyens connus au bâti 1 de la machine.
La poulie 25 est dotée d'au moins deux gorges recevant chacune une courroie 24 pour entraîner en rotation les deux galets 16 de la machine et les deux bandes abrasives 16.

Avantageusement, l'organe moteur 26 tel un moteur électrique est équipé d'un organe de selection de son sens de rotation et est associé à un moyen de variation de la vitesse de rotation de la bande abrasive 4.
L'arbre 19 est doté d'un collet 27 disposé sous le galet 16 et au niveau de l'orifice ménagé dans la table dans laquelle s'engage le dit arbre 19.
La face supérieure du collet 27 est située au-dessus du plan de travail 3 et le diamètre du dit collet est inférieur au diamètre

Entre la dite bague et l'extrémité basse du galet 16 est disposé un organe de blocage en translation du guide 6 par rapport à l'arbre 19.
Ce organe permet également de maintenir à distance l'extrémité basse du galet 16 de la bague extérieure du guide en sorte que la bande abrasive entraînée par ce galet ne puisse frotter contre la dite bague 29.
Le rayon extérieur de la bague 29 est égal ou différent du rayon hors tout de l'outil rotatif ou égal ou différent du galet 16 plus une fois l'épaisseur de la bande abrasive.
La différence entre la valeur du rayon extérieur de la bague 29 et le rayon de l'outil rotatif conditionne la valeur de la pénétration maximale du dit outil dans la pièce 8.
Pour régler la profondeur de passe la bague 29 de l'organe de roulement constituant le guide 6 est de préférence amovible en sorte que l'utilisateur en fonction des besoins du travail d'usinage puisse le remplacer par une bague de diamètre plus grand ou plus petit.
A cet effet le galet 16 est calé sur l'arbre 19 de manière démontable.
Cette disposition permet également le remplacement du galet 16 par un autre galet de plus grand ou de plus petit diamètre, mieux adapté au profil à réaliser sur la pièce 8.

Comme représenté en figure 6, le gabarit 7 coopérant avec le guide 6 est doté de butées 7B de positionnement de la pièce à usiner 8.
Cette pièce est fixée au gabarit par deux brides latérales 7C connues en soit.
Ce gabarit est pourvu d'un décrochement 7D venant se situer sous l'extrémité basse de l'outil rotatif en sorte que la face 7A soit dégagée de la dite extrémité lorsqu'elle est en appui contre le guide 6.
Avantageusement le gabarit est doté de moyens de préhension tels que des poignées fixées par tous moyens connus.

Selon une autre forme de réalisation, le guide d'usinage est constitué par un organe de roulement tel un roulement à billes, coaxial et fixé à l'arbre de l'outil et par une bague coopérant avec le gabarit calée par rapport à la bague extérieure du

orifice radial de la douille et poussée vers l'arbre rotatif par un organe élastique.
En fonction de l'épaulement choisi pour coopérer avec la face de référence 7A du gabarit la bille va s'engager dans une rainure annulaire ménagée dans l'arbre rotatif, le dit arbre rotatif présentant comme illustré plusieurs rainures superposées.

Selon une variante de réalisation la forme en gradin du guide 6 est réalisée par l'empilage des bagues de diamètres extérieurs différents.

Afin de régler le parallèlisme des axes des galets 16 et 17 coopérant avec la même bande abrasive 4 les paliers 22 dans lesquels tourillonne l'arbre 21 porteur du galet 17 sont montés sur une paroi verticale 37 articulée autour d'un arbre 38 horizontal et transversal à la direction générale de la bande 4.
L'arbre 38 est solidaire d'un organe support 39 du dispositif de tension de la bande.
Cet organe 39 est doté d'une butée 40 réglable s'opposant au mouvement angulaire de la paroi verticale 37 autour de l'axe 38 afin de conserver le parallèlisme de l'arbre 22 par rapport à l'arbre 19.
L'organe 39 est solidaire d'un arbre 41 vertical articulé au bâti 1.
Cet arbre est pourvu d'un bras 42 coopérant avec un organe de mise en tension de la bande.
Avantageusement, cet organe est constitué par un levier 43 doté d'un contre poids 44 amovible.
Ce levier est articulé au bâti et son point d'articulation est pourvu d'une tige 45 perpendiculaire au bras 42 sur lequel elle s'appuie pour que l'arbre 17 soit susceptible d'un mouvement de rotation autour de l'arbre 41 apte à tendre la bande.

La machine telle que décrite est plus particulièrement destinée à l'usinage sur des pièces en bois ou tous autres matériaux, de profils complexes sans emploi de personnel qualifié.

Il va de soi que la présente invention ne se limite pas aux exemples de réalisation décrits mais au contraire, la machine selon l'invention peut recevoir tous aménagements ou variantes tout en restant dans le cadre du présent brevet.

d'usinage tout en suivant les formes données par le gabarit.

4. Machine à outil rotatif selon la revendication 1 caractérisée en ce que le guide d'usinage (6) présente une série de gradins (6A) ou d'épaulements de diamètres différents coopérant séparément avec la face de référence du gabarit (7) et que le dit guide (6) coopère avec un moyen (33) assurant sa mobilité en translation par rapport à l'arbre (19) de l'outil et assurant son immobilisation en translation par rapport au dit arbre pour positionner le gradin (6A) sélectionné en regard de la face de référence du gabarit (7).

5. Machine à outil rotatif selon les revendications 1 et 4 caractérisée en ce que le moyeu comprend une douille (33) sur laquelle est monté rotatif le guide (6), emmanchée sur l'arbre (19) de l'outil de telle manière à ce qu'elle soit libre en translation et fixe en rotation par rapport au dit arbre et coopérant avec des dispositifs (33A) de commande de sa translation par rapport au dit arbre et avec des moyens assurant le positionnement de la dite douille par rapport au dit arbre.

6. Machine à outil rotatif selon les revendications 1,4 et 5 caractérisée en ce que la forme en gradin du guide d'usinage (6) est réalisée par l'empilage de bagues de diamètre extérieur différent.

7. Machine à outil rotatif selon la revendication 1 caractérisée en ce que le dit gabarit (7) est doté d'un décrochement permettant de dégager sa face de référence de l'extrémité basse de l'outil rotatif (4).

8. Machine à outil rotatif selon la revendication 1 caractérisée en ce que le contour de forme polygonale circulaire ou curviligne du plan de travail (3) de la table (2) présente au moins un côté (14) de raccordement au profil de la table et perpendiculaire ou transversal au mouvement d'avance du gabarit (7) et de la pièce (8) par rapport à l'outil rotatif (4).

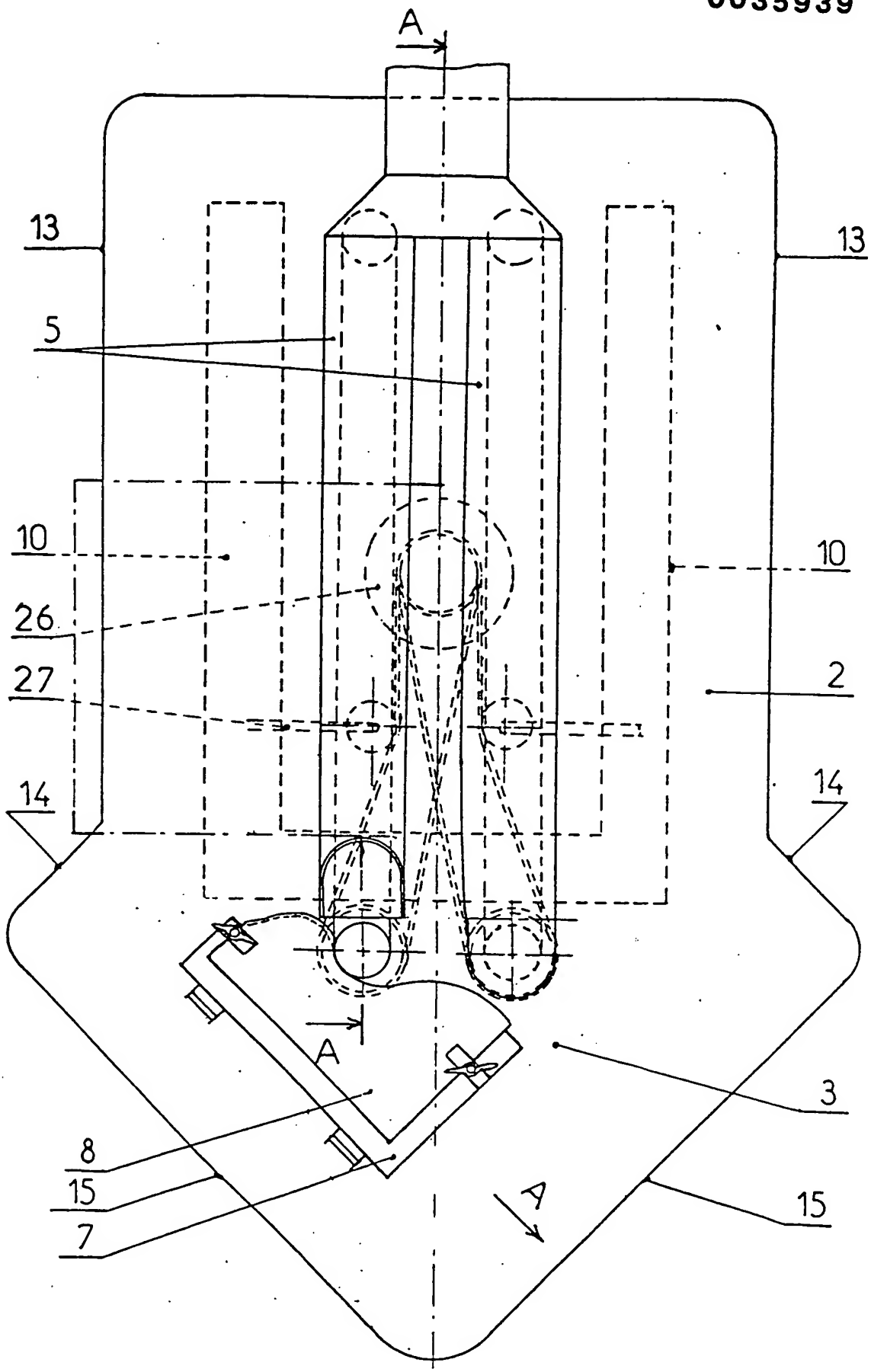
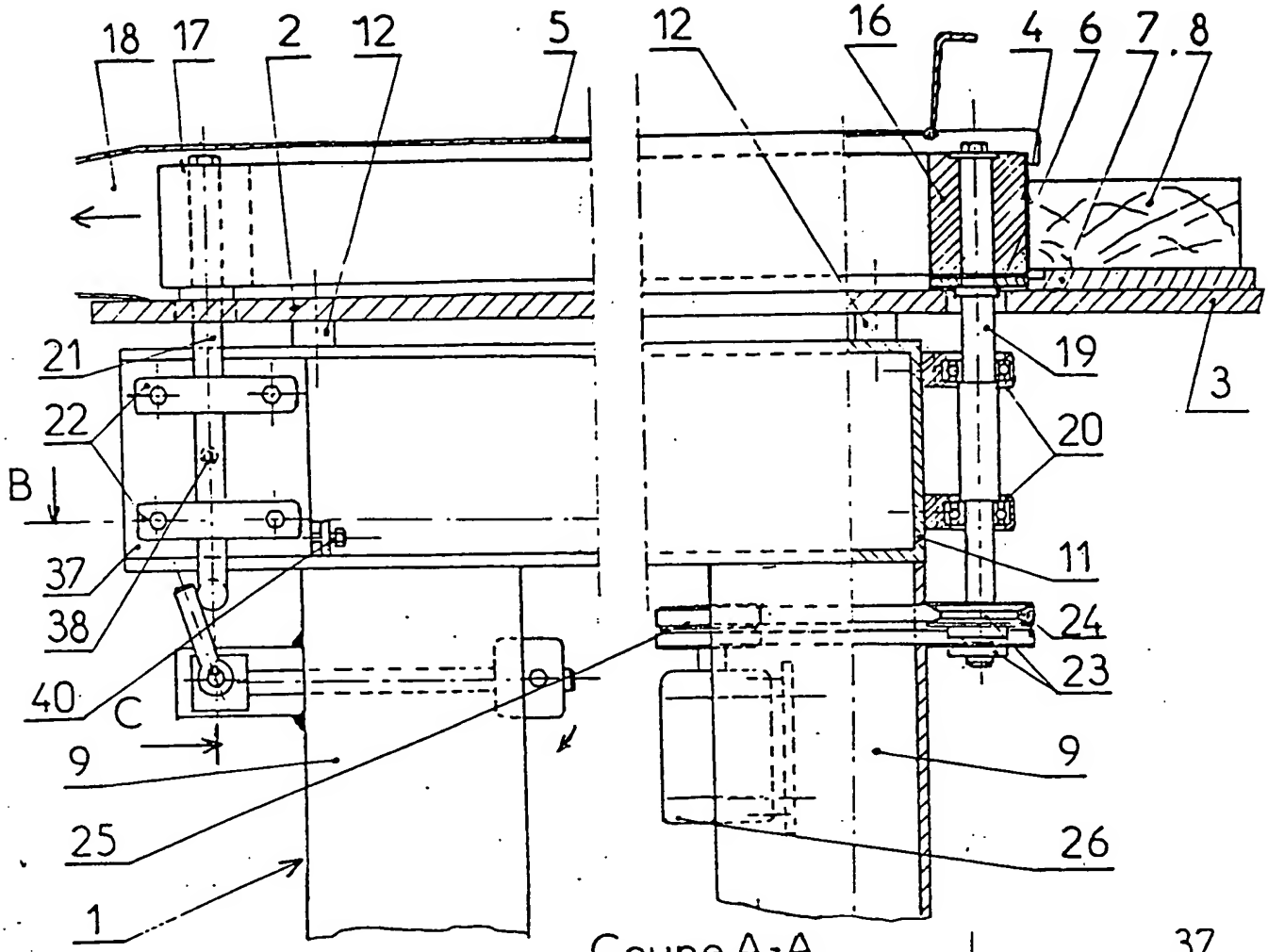
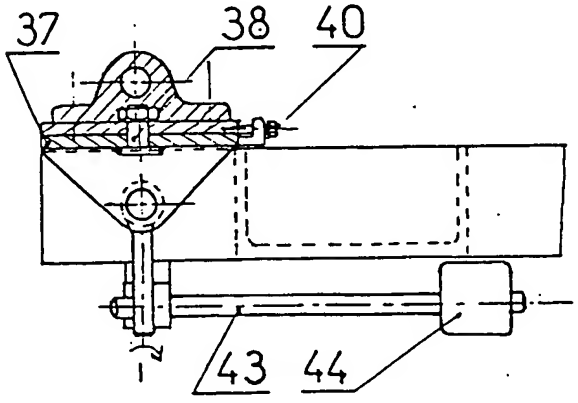


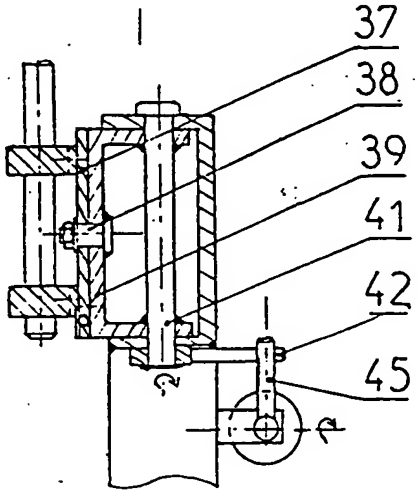
Fig 1



Coupe A-A
fig 2



Coupe BB
fig 7



Coupe CC
fig 8

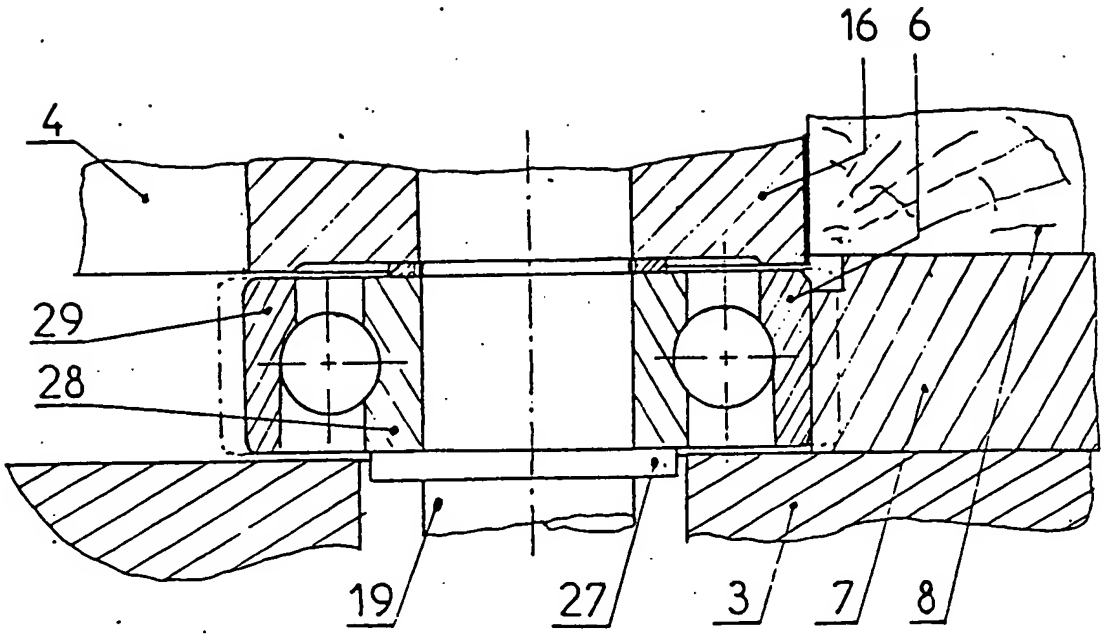


Fig3

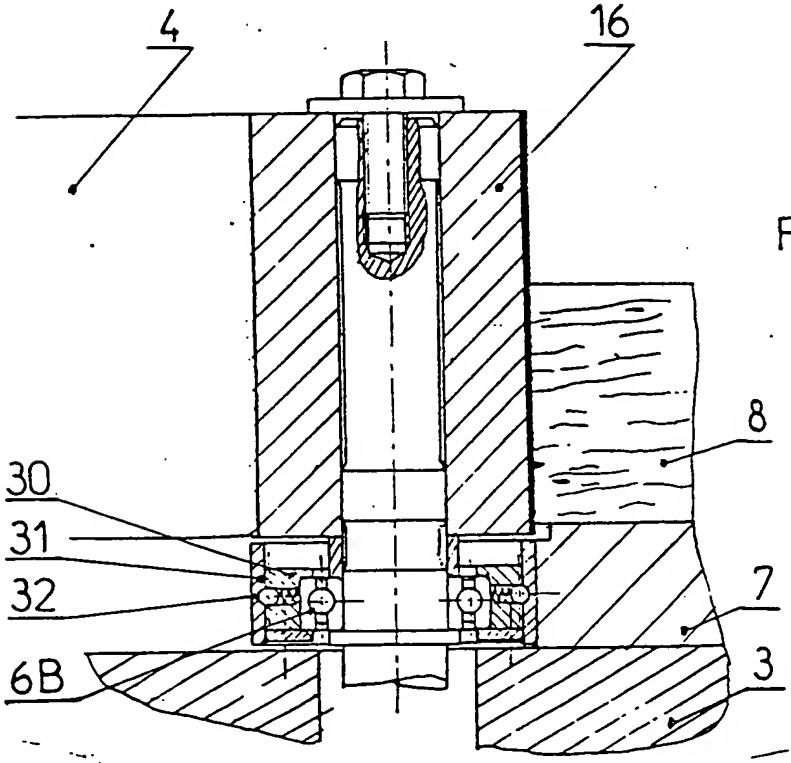


Fig 4

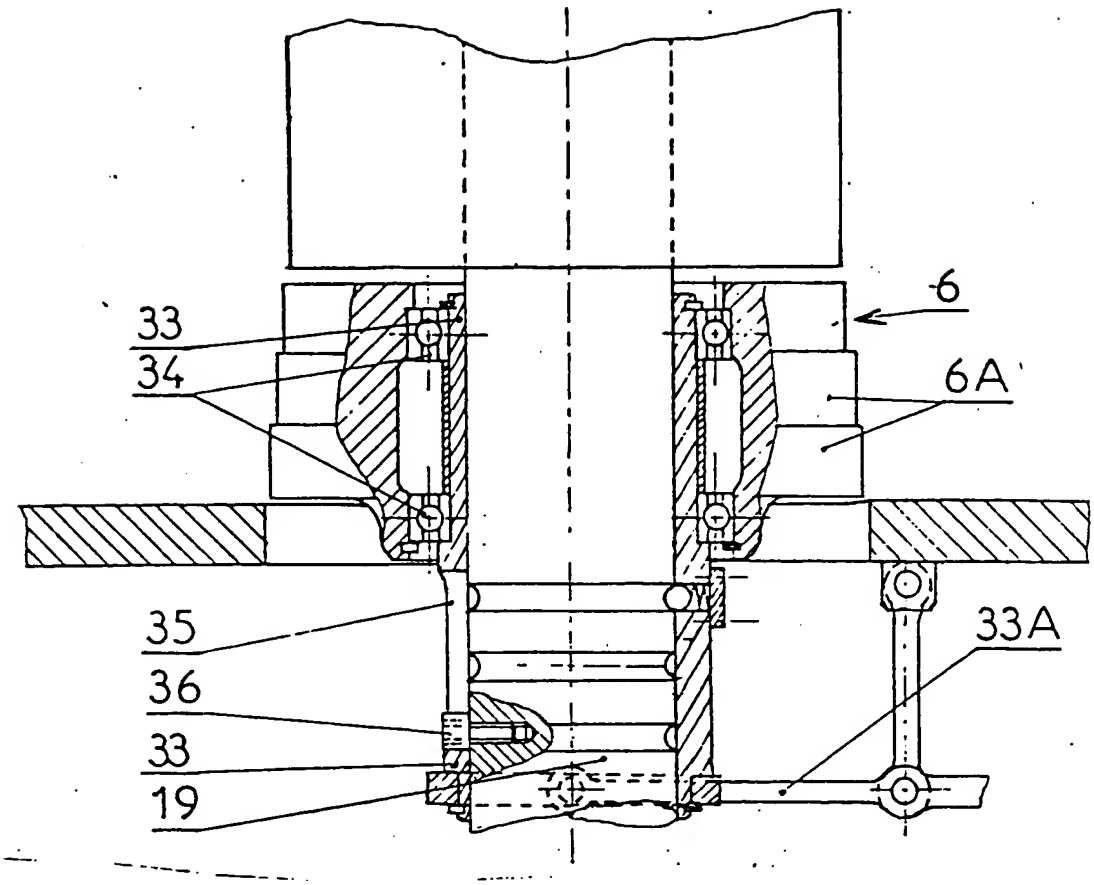


Fig 5

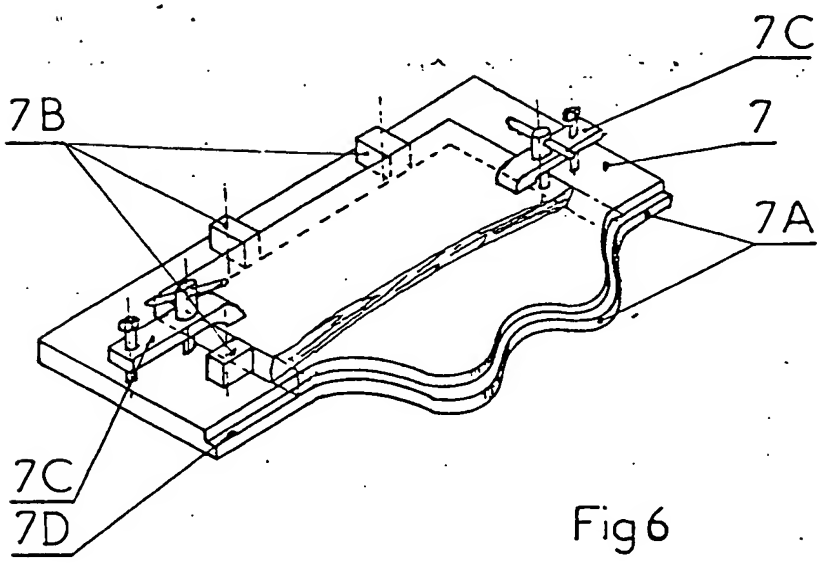


Fig 6

Rotating tool used for reproduction or finishing projects

The present invention has as an aim, a machine with a rotating tool intended to reproduce onto an object, a design from a mould or to finish a piece with a rough draft of a certain design.

It is known in the case of wood working by reproduction of a part beforehand outlined or not for machines equiped with a body of work holding to a machine or mould (pattern, stencil) on a piece of work and with a rotary tool such as a removable abrasive band following the contour of the mould.

The disadvantage of this type of machine is that one must regulate in a very precise way, the position of the part compared to the design or mould and/or the tool before operating the machine.

Another inconvenience resides in the mobility of the tools which are detailed in the French patent no. 2.229 501, which takes play with use from where a loss of precision occurs with the machine.

Other known machines use a mobile tool carriage on slides of the scheme of work and which is equiped with a roller cooperating in guidance with the mould or design.

To obtain a precise guidance of the workpiece, the guides or slides of the tool carriage must be realized in a precise way and the various bodies are generally equipped with special installations limiting their wear which renders the manufacture of such long and expensive machine.

Generally, this type of machine is more particularly intended for projects of mass production. Employment from it's costs is not possible for small or average series. The cost of running such a machine makes it impossible for use in small or average productions.

The purpose of the present invention such as it is characterized in the claims here after is: the suppression of these disadvantages by implementing a machine simple to realize and inexpensive, particularly intended for the machining of small series of parts in a precise way without any adjustments of the position of the workpiece compared to the tool and without particular adjustment of the position of the part compared to the mould or design.

Another goal of the invention is the placement of a machine which does not require for the machining of the parts a qualified personnel what tends to reduce the cost of the finished product in spite of the number of workpieces on the assumption of a use of the machine according to the invention for small series.

The reading of description hereafter in which the invention is described more in detail according to a preferential form of realization will facilitate its comprehension.

- figure 1 is a sight of top of such a machine.

- figure 2 is a sight of the machine out of cut AA following figure 1.

- figures 3.4.5 are cross-sections of examples of realization of the guide of machining.

- figure 6 is a sight in prospect for a gauge for machining.

- figures 7 and 8 are sights of the system of setting in tension of the abrasive band and adjustment of the parallelism of the rotary rollers.

The machine with rotary tool according to the invention can be a machine used for the reproduction of parts starting from a gauge or mother part or a type of grinder machine, used for the completion of parts starting from a gauge or mother part.

As represented, the machine according to the invention has for example a grinder type to double band includes a frame 1 on which a table 2 equipped with at least a scheme of work is posed 3.

In the zone of the scheme of work the machine is equipped with at least an abrasive rotary tool 4 , assembled in a storage case 5 and equipped with at least a guide 6 (figure 12) cooperating with a gauge 7 on which is fixed the workpiece 8 outlined beforehand, the mentioned gauge and part being operated by the user of the machine

Frame 1 is constitutes four vertical feet 9, of the same length braced at their higher end by two horizontal and parallel members 10 and by at least a cross-piece 11 horizontal and perpendicular to which it is fixed.

Members 10 are equipped with several cylindrical openings of vertical axis of passage in order to be able to fix the table 2 with the frame 1.

Preferably, the machine is equipped with at least three holds 12 interposed between the members and the table to regulate the position of this one compared to the frame and/or to regulate the orthogonality of its scheme of work compared to the axis of the rotary tool

The metal table 2 or other is presented as horizontal planes, polygonal or curvilinear external contour preferably equipped with at least a curvilinear, circular or polygonal contour defining the scheme of work 3.

The contour of the scheme of work is such as whatever the position of the user of the machine is compared to the contour, this one can reach the rotary tool without any hindrance..

The form of the contour of the scheme of work is such as it also makes it possible to completely lay out the gauge on the scheme of work and this in spite of the position of the known as gauge compared to the rotary tool when it machines the part.

According to a preferential embodiment as represented in figure 1, the table appears as a rectangle of longitudinal axis parallel with the members prolonged beyond one on its small sides by the scheme of work 3.

This scheme of work appreciably marries the shape of a triangle whose great base is perpendicular to the longitudinal axis of the rectangular form and overflows the shape on both sides on its longitudinal sides 13, the base being broader than the table.

The scheme of work is equipped with two small sides 14 connecting longitudinal sides 13 of the rectangular shape of table 2. Sides 15 are preferably perpendicular one to the other or form between them an angle higher than a right and are laid out in a symmetrical way compared to the longitudinal axis of the rectangular shape of the table.

Advantageously sides 15 are connected one to the other by a round-off for obvious reasons of safety to the expert.

Moreover, to decrease the footing of the machine, the sides 14 of the scheme of work are perpendicular to the sides 15 to which they are connected or formed with those an obtuse angle.

The scheme of work as described is particularly adapted to receive two rotary tools located respectively on both sides of the longitudinal axis of the table 2. Preferably the two abrasive rotary tools are of different size of grain first of all to carry out a half-completion while working with the tool, whose size of grain is most important and a completion while working with the other tool

For that the user of the machine will engage the beforehand

outlined part and its gauge on the scheme of work by one on the small sides 14 and all while applying it against the abrasive tool will print to him a movement (visualized in advance on the figure. 1 by the arrow A) directed on this side 14 towards the zone of the scheme of work located in the longitudinal axis of table 2.

After realization of the half-completion as represented in figure.1 the user proceeds by engaging the part and its gauge by the small symmetrical side 14 with the completion with the second rotary tool.

According to a preferential embodiment, the abrasive tools 4 are made up each one by an abrasive band without end partially located in the scheme of work assembled on rollers 16 and 17 of perpendicular axes to the plan.

The abrasive bands are advantageously placed in a storage case connected to a tube 18 vacuuming the waste coming from the machine.

This casing is equipped with at least two lids assembled on hinges to allow the change of the abrasive band and/or rollers 16 and 17.

These rollers are fixed in a removable way by all means on vertical rotary trees and engage each one in an opening spared in table 2 and rotate in stages located under the table.

The tree 19 correspondent with roller 16 is assembled in at least two stages 20 fixed by all means at one of the vertical faces of cross-piece 11 of frame 1.

The tree 21 correspondent with roller 17 is assembled in at least two stages 22 fixed on a means of setting in tension of the band and adjustment of the parallelism of two rollers 16 and 17.

Tree 19 beyond its lower stage 20 is equipped with a pulley 23 equipped with a throat receiving a driving belt 24 cooperating with a pulley 25 fixed on the output shaft with a driving body 26

interdependent of frame 1

The belt 24 is put in tension by a tensioner 27, is schematically represented in figure 1.

This tensioner is fixed by all means at frame 1 of the machine.

Pulley 25 is equipped with at least two throats each one receiving a belt 24 to rotate two rollers 16 of the machine and the two abrasive bands 16.

Advantageously, the driving body 26 as such an electric motor, is equipped with a selection body of its direction of rotation and is associated to a variation number of revolutions of the abrasive band 4.

Tree 19 is equipped with a band 27 laid out under roller 16 and to the level of the opening spared in the table in which engages tree 19. The higher face of the band 27 is located above the scheme of work 3 and the diameter of the band is lower than the diameter of the opening of the table in which tree 19 engages.

Against the higher face of the band 27 and under the low end of roller 16 is mounted the guide of machining 6.

Against this guide in the course of machining, comes to butt the face of reference 7a of gauge 7.

In the example of realization represented of figure 1, the profile of the face 7a is curvilinear and presents a succession of hollow and bumps which must be reproduced on part 8 range by the gauge.

When the user prints on the piece and his gauge, a movement in advance guide 6 follows the profile of the face of reference 7A so that the part is also actuated by a movement compared to the abrasive tool to reproduce in advance on one of the faces of the

part, the profile of the face 7A.

The generator of the rotary tool which penetrates more in part 8 is always located in a plan which passes by the axis of rotation of the tool and the guide and by the point of contact of the guide with the face of reference 7A of the gauge.

This condition must be met reguardless of the position of part 8 in the course of machining and its gauge compared to the longitudinal axis of the machine.

This characteristic makes it possible to reproduce on the part of the relatively complex profiles without having imposed angle of attack.

To this end, guide 6 of circular or cylindrical form, is equipped with at least a revolutionary external surface , for example circular or cylindrical coaxial with tree 19 and free in rotation compared to this one against which comes to butt the face of reference of the gauge.

Guide 6 is free in rotation compared to the tree 19 on which it is assembled so that when the tree and the tool is animated by a rotational movement the guide can make rotation by friction against the gauge 7.

Preferably the quide 6 is consisted a body of bearing equipped with an interior ring 28 coaxial to the tree 19 on which it is blocked and of an external ring 29 free in rotation compared to tree 19.

The interior ring 28 is assembled in force on tree 19 and rests on the higher face of band 27.

Between the ring and the low end of roller 16 is laid out a body of blocking in translation of guide 6 compared to tree 19.

This body also makes it possible to maintain the low end of roller 16 of the ring external of the guide so that the abrasive band trained by this roller cannot rub against ring 29.

The external ray of ring 29 is equal or different from the overall

ray of the rotary tool or equal or different from roller 16 plus once the thickness of the abrasive band.

The difference between the value of the external ray of ring 29 and the ray of the rotary tool conditions the value of the maximum penetration of the tool in part 8.

To regulate the depth of cut ring 29 of the body of bearing constituting guide 6 is preferably removable so that the user according to the needs for the machine-work, can replace it by a ring of larger or smaller diameter.

To this end, roller 16 is fixed on dismountable tree 19.

This provision also allows the replacement of roller 16 by another roller of larger or smaller diameter, better adapted to the profile to realize on part 8.

As represented of figure 6, gauge 7 co-operating with guide 6 is equipped with obstinate positioning 7b of the piece to machine 8.

This part is fixed at the gauge by two side supports 7c.

This gauge is equipped with a setback 7d coming to be located under the low end of the rotary tool so that the face 7a is disengaged from the end when it is in support against guide 6.

Advantageously the gauge is equipped with means of gripping such as handles fixed by all known means.

According to another embodiment, the guide of machining is consisted of a body of ball bearing, coaxial and fixed at the tree of the tool and by a ring cooperating with the fixed gauge compared to the external ring of the bearing by a body of positioning interdependent of the external ring.

As represented of figure 4 guide 6 consists of a ball bearing 6b gone up in a way on tree 19, an intermediate body or a ring 30 interdependent of the external ring of the bearing and a removable ring 31 fixed and positioned on body 30.

This ring 31 is intended to cooperate with the face 7a of gauge 7

Ring 30 is equipped with a series of radial openings respectively receiving devices of blocking of ring 31.

These bodies made up by an elastic body, spring acting on a ball which is committed when ring 31 is installed in an annular throat 32 spared in the thickness of ring 31 and opened towards its axis.

According to another embodiment as represented of figure 5, the guide of machining 6 presents a series of steps or shoulders 6a of different diameters intended to cooperate with the face 7a of the gauge, so that the user of the machine can choose the depth of cut of the tool without having to dismount the said guide 6.

To this end, this guide of machining is assembled rotary and fixed in translation on a coaxial casing 33 at the tree 19 on which it is assembled.

Preferably, the bodies of bearing 34 are laid out between the casing and the guide in a known way of the expert.

Casing 33 is equipped with a longitudinal oblong opening parallel with the axis of tree 19.

In this opening is committed a means of stop in rotation preferably made up by a screw 36 committed in a threaded opening spared in tree 19.

To lay out one of the shoulders 6a of roller 6 compared to the face 7a of gauge 7 and to block it in this position casing 33 cooperates with a fork lever 33a articulated with frame 1 and is equipped with a means of stop in translation compared to tree 19.

This means is consisted with a ball engaged in a radial opening of the casing and pushed towards the rotary tree by an elastic body.

According to the shoulder chosen to cooperate with the face of reference 7a of the gauge the ball will engage in an annular groove spared in the rotary tree, the rotary tree as illustrated several

superimposed grooves.

According to an alternative realization, the shape in guide 6 is carried out by the stacking of the rings of different external diameters. In order to regulate the parallelism of the axes of rollers 16 and 17 co-operating with the same abrasive band the 4 stages 22 in which rotates the tree 21 carrier of roller 17 are assembled on a vertical wall 37 articulated around a horizontal and transverse tree 38 with the general direction of band 4.

Tree 38 is interdependent of a body support 39 of the expander of the band.

This body 39 is equipped with an adjustable thrust 40 being opposed to the angular movement of the vertical wall 37 around axis 38 in order to preserve the parallelism of the tree 22 compared to tree 19.

Body 39 is interdependent of a vertical tree 41 articulated with frame 1.

This tree is equipped with an arm 42 co-operating with a body of setting in tension of the band.

Advantageously, this body consists of a lever 43 equipped with removable weights 44 .

This lever is articulated with the frame and its joint is equipped with a stem 45 perpendicular for the arm 42 on which it is pressed so that tree 17 is likely of a rotational movement around tree 41 ready to tighten the band.

The machine as described is more particularly intended for machining on all other material or pieces of wood, complex profiles without employment of qualified personnel.

It goes without saying the present invention is not limited to the

described examples of realization but on the contrary, the machine according to the invention can receive all installations or alternatives while remaining within the framework of this patent.

Claims

1. Machine with rotary tool for work of reproduction or completion and in particular for the machining of the contour of at least a part (8) fixed flat above a gauge (7) of reproduction, the machine consisting of a frame (1) on which is assembled a work table (2) equipped with at least a scheme of horizontal work (3) in the zone of which is located or partially located at least a tool (4) fixed on a vertical rotary tree (19) appreciably above a cylindrical guide (6) assembled insane on the same axis above the outline level of work so that it can cooperate with the edge of the gauge (7) the gauge unit of a plan of work, characterized in what the cylindrical guide (6) comprises of the means likely to maintain the unit gauge workpiece at various distances of the tool (4) compared to the part (8) several machining passes of the contour of the part to depths different according to the form from the contour of the gauge (7).

2. Machine with rotary tool according to claim 1 characterized in what the guide (6) comprises of at least a cylindrical external ring of guidance (29) or (31) interchangeable with at least another cylindrical ring of different external diameter so that their consecutive use on the vertical shaft (19) of the same tool (4) or on the tool shaft of diameter equal to the first tool allows without disassembling of the part (8) and disassembling of the gauge (7) to carry out several master key of machining.

3. Machine with rotary tool according to claims 1 and 2 characterized in what the guide (6) consists of a ball bearing type , with rollers or others, whose interior ring (28) is fixed on the rotary tree (19) of the tool and whose external ring (29) is removable and interchangeable with at least one other external ring of different external diameter of manner so that their successive use, while

starting with that of higher diameter until that of lower diameter makes it possible to carry out several machining passes while following the forms given by the gauge

4. Machine with rotary tool according to claim 1 characterized in that the guide of machining (6) presents a series of steps (6a) or shoulders of diameters different cooperating separately with the face from reference of the gauge (7) and which the guide (6) cooperates with a means (33) ensuring its mobility in translation compared to the tree (19) of the tool and ensuring its immobilization in translation compared to the tree to position the step (6a) selected compared to the face of reference of the gauge (7).

5. Machine with rotary tool according to claims' 1 and 4 characterized in that the means includes/understands a casing (33) on which is mounted the rotary guide (6), fixed on the tree (19) of the tool in such manner so that it is free in translation and fixed in rotation compared to the tree and cooperating with devices (33a) of ordering of its translation compared to the tree and with means ensuring the positioning of the casing compared to the tree.

6. Machine with rotary tool according to claims' 1, 4 and 5 characterized in that the shape in step of the guide of machining (6) is carried out by the stacking of rings of different external diameter.

7. Machine with rotary tool according to claim 1 characterized in that the gauge (7) is equipped with a setback making it possible to release its face of reference of the low end of the rotary tool (4).

8. Machine with rotary tool according to claim 1 characterized in that the contour of circular or curvilinear polygonal form of the scheme of work (3) of the table (2) presents at least a side (14) of connection at the transverse profile of the table and perpendicular or to the movement in advance of the gauge (7) and part (8) compared to the rotary tool (4).

9. Machine with rotary tool according to claims' 1 and 8 characterized in that the contour of the scheme of work (3) is of triangular form and is connected to the profile of the table (2) by two side transverse (14) with the direction in advance of the gauge (7) and the part (8) what allows whatever the position of the user compared to the contour that this one can without any embarrassment reach either one of the tools (4).

10 Machine with rotary tool according to the claim 1 and each preceding claim characterized in that it comprises on the scheme of work two rotary tools (4) consisted two endless rotating conveyor belts .

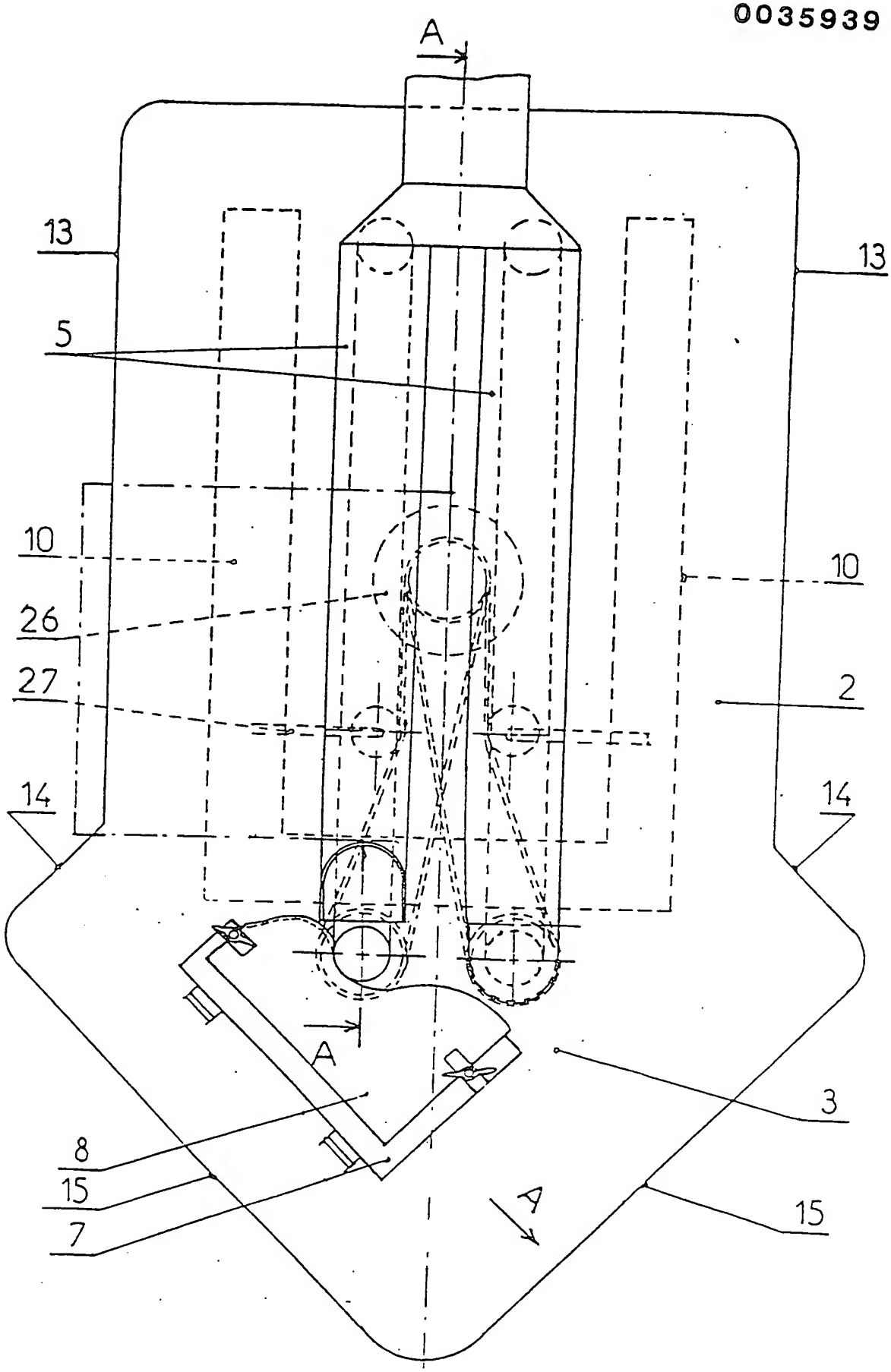
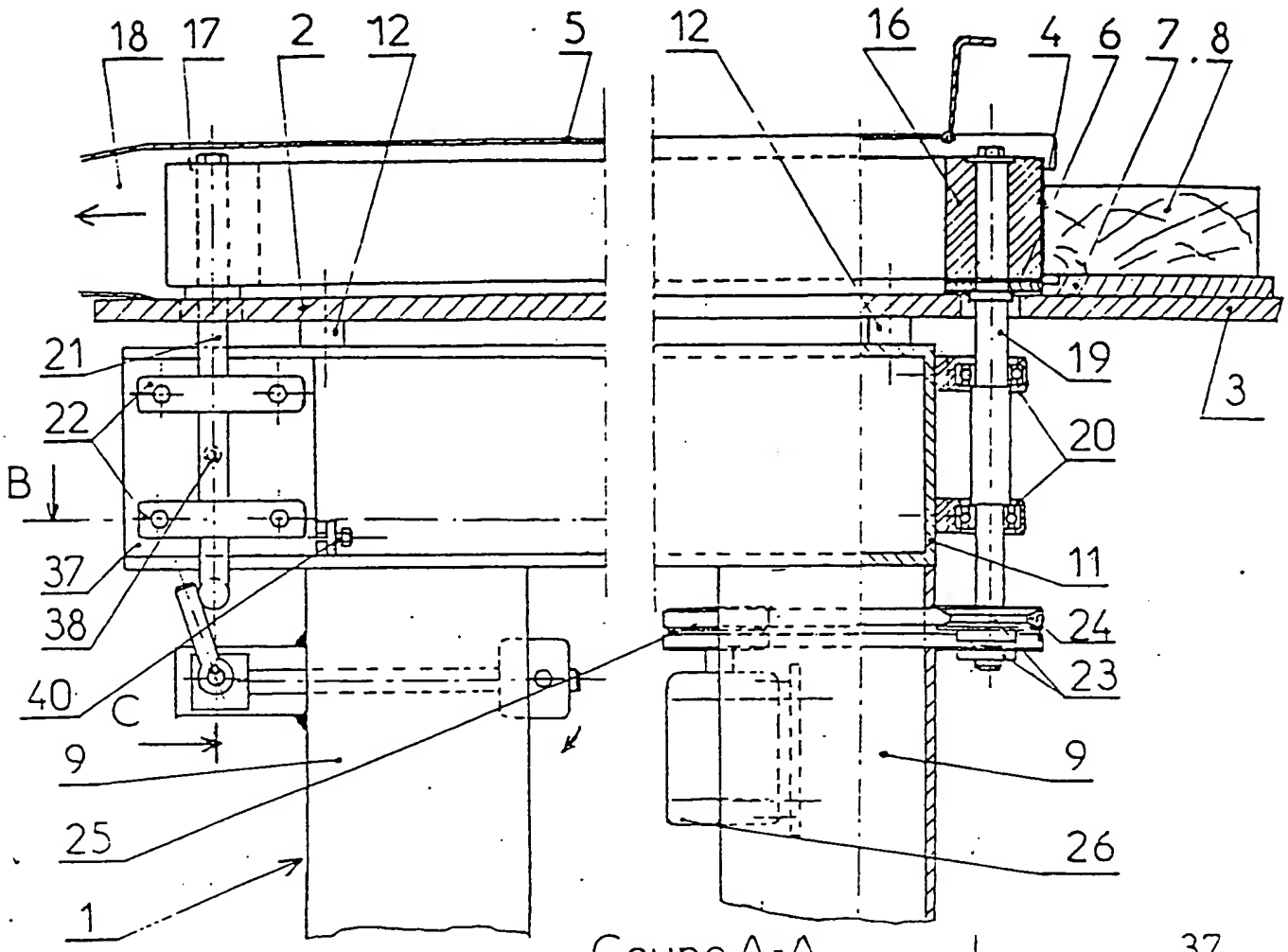
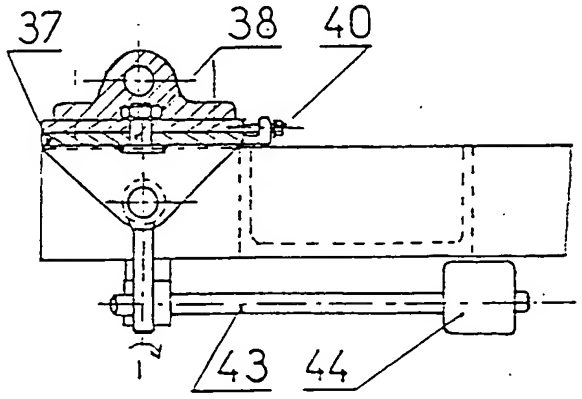


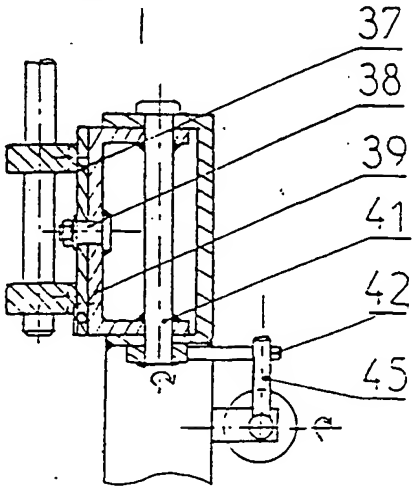
Fig 1



Coupe A-A
fig 2



Coupe BB
fig 7



Coupe CC
fig 8

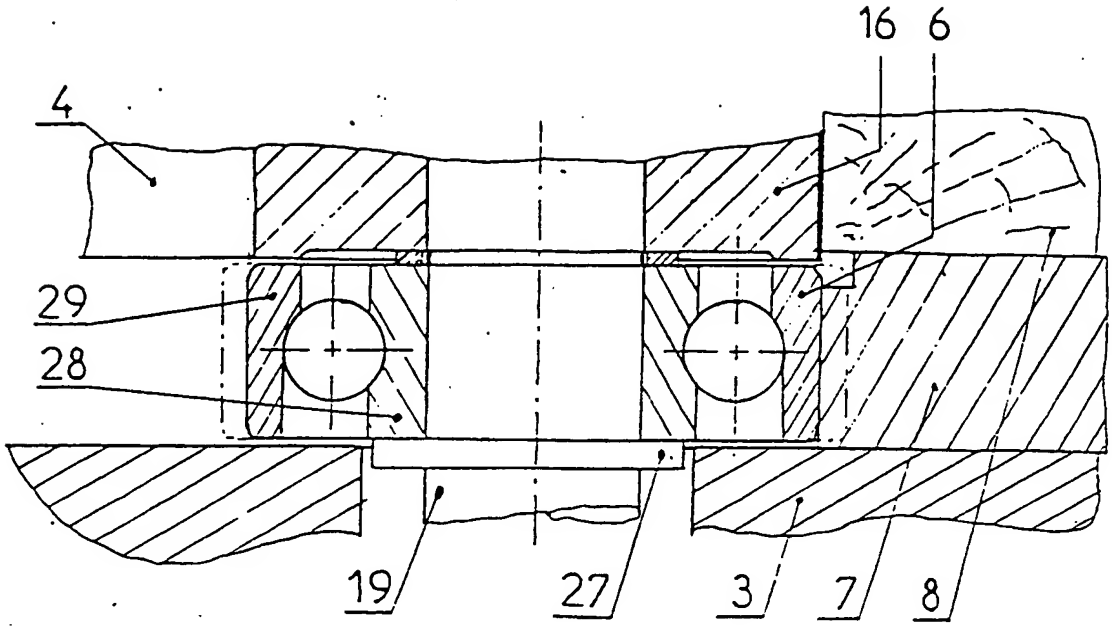


Fig3

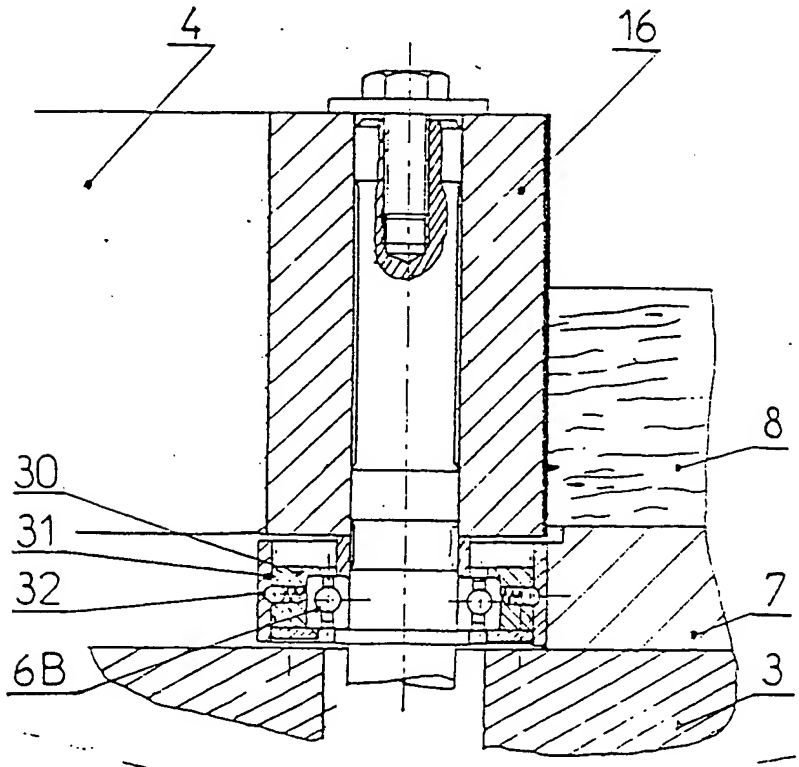


Fig 4

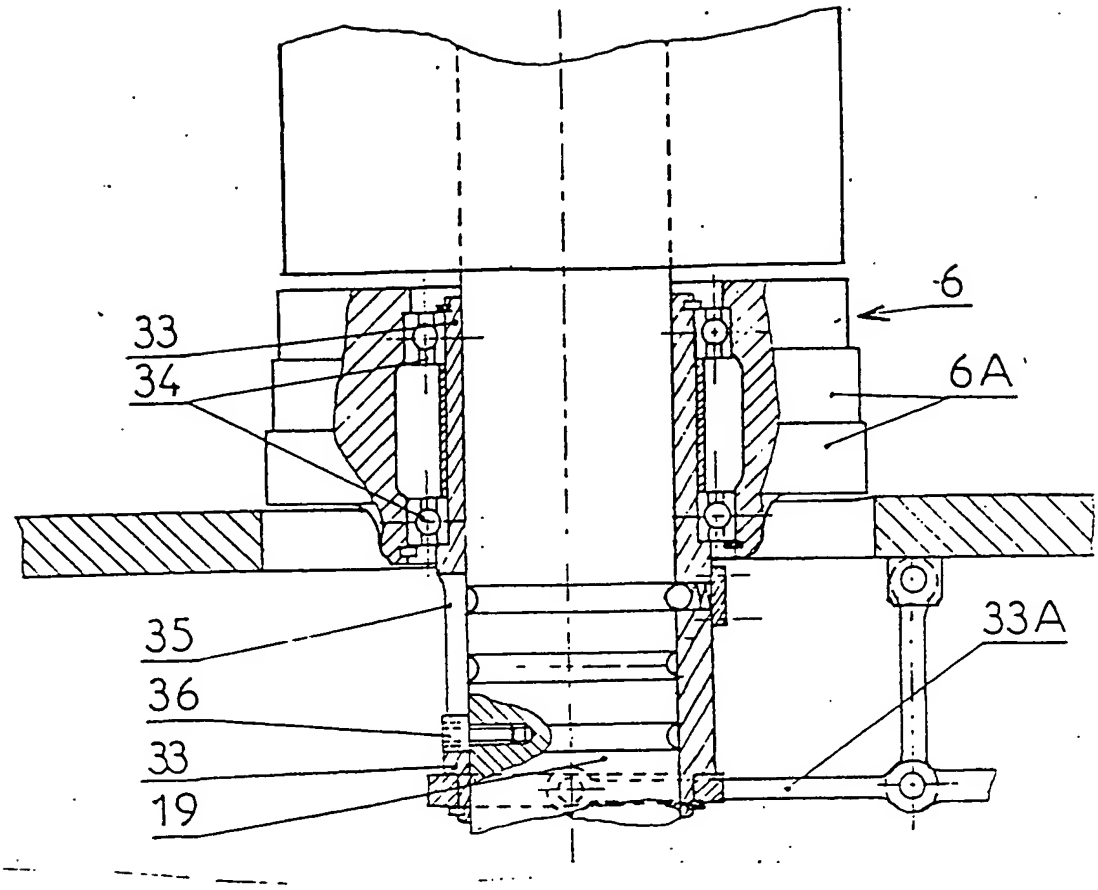


Fig 5

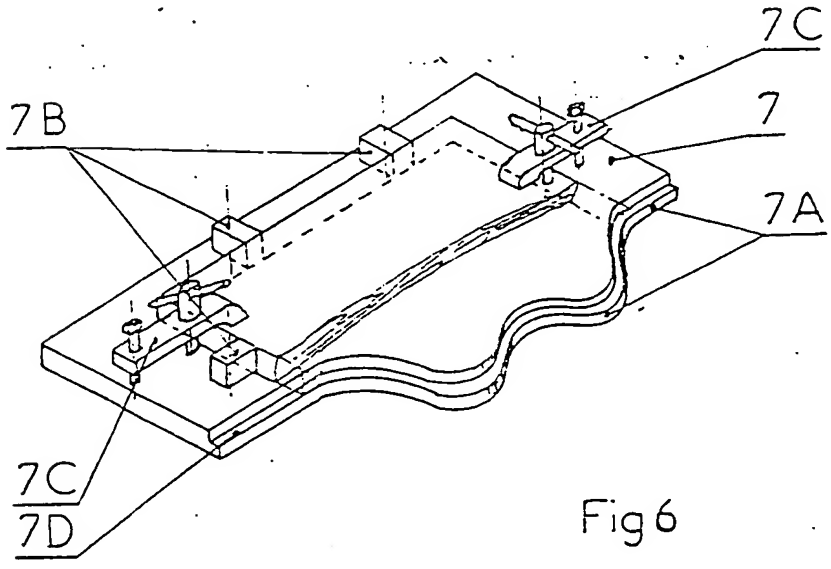


Fig 6